REMARKS

Reconsideration is requested.

The specification has been revised to correct an inadvertent error in translation of the application to English, as indicated in the attached Certification of Translation. No new matter has been added.

Claims 3 and 9 have been canceled, without prejudice. Claims 16 and 17 have been added. Support for the amendments may be found throughout the specification. Support for the revisions to claim 1 may be found, for example, in ¶¶ [0001], [0039]-[0040] and [0047] of the U.S. Patent Office publication of the specification. Support for the revisions to claim 15 may be found, for example, in ¶¶[0040] – [0044] of the U.S. Patent Office publication of the specification. No new matter has been added. Claims 1, 2, 4-8 and 10-17 are pending.

The Section 112, second paragraph, rejection of clams 1-14 is obviated by the above amendments. Claim 1 has been revised in response to the Examiner's comments on page 2 of the Office Action dated April 1, 2010. Claims 4, 6, 7, 8 and 13 have been revised to delete the objected-to phrases. The claims are submitted to be definite.

To the extent not obviated by the above amendments, the Section 102 rejection of claims 1 and 3-15 over Laine (U.S. Patent No. 5,958,361), is traversed. Reconsideration and withdrawal of the rejection are requested in view of the above and the following remarks.

The cited patent describes a process for preparing ultrafine metal oxide and

mixed metal oxide powders prepared by flame pyrolysis by means of flame spray pyrolysis of a ceramic precursor solution containing one or more glycolato polymetallooxanes dissolved in a volatile organic solvent (see Abstract).

The process of the cited patent does not use a precursor of formula (II) $(A)_cM(X)_d$ wherein A represents a cation, M represents a transition metal or a metal from group III, IV or V of the periodic table of the elements, X represents a chalcogen selected from oxygen, sulfur, selenium and tellurium, and c and d each represents the proportion of cations and of chalcogens.

The precursors used in the process of the cited patent are different from those of the claimed process since they contain R groups, Z moieties and/or an N atom (see for example, columns 6-10). Specifically, as disclosed column 7 lines 25-26 of the cited patent, the glycolato precursor is at least a glycol. The precursor is therefore different from that used in the presently claimed process.

Withdrawal of the Section 102 rejection is requested as the cited document fails to teach each and every element of the claimed invention.

The applicants request consideration of the following further distinctions between the cited art and the present invention.

The process of the cited patent uses flame spray pyrolysis, which differs from spray pyrolysis at least in that it involves combustion of the precursor and/or solvent (i.e., "combustion" means in the presence of oxygen gas), with concomitant thermal decomposition of the precursor to the metal oxide particles.

As seen column 14 lines 56-57 and claim 1 of the cited patent, the process of the

cited patent is carried out in a flow of oxygen gas or oxygen-enriched gas. It is the oxygen gas that allows the formation of metal oxides from the glycolato precursors. See, for example column 15 line 4 ("…and forms, through decomposition and oxidation of the glycolato polymetallooxane contained in the precursor solution …") (emphasis added).

In contrast, the presently claimed process is carried out in an inert gas. The formation of metal oxide particles occurs through thermal decomposition of the precursor of formula (II) $(A)_cM(X)_d$. No oxidation takes place.

All the atoms of the final metal oxide are found in the precursor in the claimed process (there are no added oxygen atoms via the addition of oxygen gas during atomization).

In addition, the metal M does not become oxidized in the claimed process: M has the same oxidation state in the precursor and in the final product (e.g., $(NH_4)_2MoS_4$ (precursor) and MoS_2 (final product): Mo has oxidation state +IV in both cases (see ¶[0059] and [0061] of the present Application)).

In the process of the cited patent, ethanol may be used as the solvent for the precursor, which is also a solvent that may be used in the claimed process (see new claim 17). However, in the case of cited patent, the ethanol is involved in the combustion process, and therefore influences the thermal conditions leading to the formation of the final products (cf. column 12, lines 28-38 of the cited patent).

Withdrawal of the Section 102 rejection is requested.

To the extent not obviated by the above amendments, the Section 103 rejection

of claim 2 over Laine in view of Doty (U.S. Patent No. 4,689,247), is traversed. Reconsideration and withdrawal of the rejection are requested in view of the above and the following distinguishing comments.

The deficiencies of the primary patent are not cured by the secondary patent. Withdrawal of the Section 103 rejection is requested.

The Doty patent is apparently being relied upon for the teaching of the use of a nebulizer to form an aerosol.

As discussed above, the Laine patent does not describe a spray pyrolysis process involving the use of a precursor of formula (II) $(A)_cM(X)_d$ wherein A represents a cation, M represents a transition metal or a metal from group III, IV or V of the periodic table of the elements, X represents a chalcogen selected from oxygen, sulfur, selenium and tellurium, and c and d each represents the proportion of cations and of chalcogens.

The Doty patent does cure the deficiencies of the cited Laine patent, as it at least does not teach or suggest the use of a precursor of formula (II) $(A)_cM(X)_d$ as claimed. In fact, in the Examples I and II, at columns 10 and 11 of Doty, two precursors are used: one precursor of the metal ($CdCl_2$), and one precursor for the chalcogenide (thiourea, and telluric acid, respectively). The Doty patent does no teach the use of a single precursor which contains both the metal M and the chalcogenide X in a single species/compound.

The obviousness rejection should be withdrawn, because the combination of cited art does not teach or suggest the claimed invention.

The claimed invention provides industrial quantities of metal chalcogenides

having lamellar crystallographic structure in the form of closed-structure nanoparticles.

The claimed method can be used to obtain nanoparticles of metal chalcogenides having lamellar crystallographic structure, constituted by directed crystallographic planes which form a layer assembly. This has the advantage of giving easier sliding and better lubrication capacity in the solid state.

The nanoparticles obtained also have a closed structure, thereby minimizing the number of pendent bonds and improving the chemical stability of the material.

The process of the disclosure involves a pyrolysis under inert atmosphere of a liquid aerosol obtained from a solution of at least one precursor with the formula $(A)_cM(X)_d$ in which A represents a cation, M and X represent a metal and a chalcogen, respectively, and that leads to a metal chalcogenide M_aX_b of lamellar crystallographic structure, and c and d represent the number of cations and chalcogens respectively.

The precursor of formula $(A)_cM(X)_d$ already contains M-X bonds, which is advantageous for synthesizing the material M_aX_b under the particular conditions of inert gas aerosol pyrolysis. The aerosol itself is advantageous for obtaining lamellar metal chalcogenide particles of closed structure (i.e., with lamellae closed upon themselves). The spray particles are isolated from each other and they contain little precursor.

The claimed invention would not have been obvious from the combination of cited art. Withdrawal of the Section 103 rejection is requested.

The claims are submitted to be in condition for allowance and a Notice to that effect is requested. The Examiner is requested to contact the undersigned, preferably by telephone, in the event anything further is required.

Respectfully submitted,

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Certification of Translation

I, Nadège LAGNEAU, of Novagraaf Technologies, 122, rue Edouard Vaillant 92 593 Levallois-Perret Cedex, France, do hereby certify that I am conversant with the English and French languages and am a competent translator thereof, and I further certify that to the best of my knowledge and belief the following French text of the paragraph spanning pages 9-10 of the published application WO 2005/056479 is translated in to English as shown below:

Original French:

Lesdites nanoboîtes constituent des produits nouveaux et, à ce titre, entrent également dans le champ de l'invention. Il s'agit de parallélépipèdes droits et rectangles, fermés, généralement creux, à savoir de section essentiellement rectangulaire.

Translation to English:

Said nanoboxes are novel products and consequently also fall within the scope of the invention. They are closed, generally hollow rectangular parallelepipeds, namely of essentially rectangular cross-section.

Levallois-Perret, France, 30 July 2010

Nadège LAGNEAU